

**What is claimed is:**

1. An ion beam device comprising:  
a holder member fixing a sample with a section formed thereon by irradiation of a specified focused ion beam from a surface side; and  
gas ion beam irradiation means for irradiating a gas ion beam to a region of the sample fixed using the holder member containing the section to remove a damage layer on the section, wherein  
the gas ion beam is irradiated from the rear surface side of the sample to the section at a specified incident angle.
2. The ion beam device of claim 1, further comprising focused ion beam irradiation means for irradiating the specified focused ion beam.
3. The ion beam device of claim 1, wherein the gas ion beam is an inert gas ion beam.
4. The ion beam device of claim 1, wherein the holder member comprises a clamp section for clamping the sample from a rear side thereof, and a fixing platform, provided with a fixing surface arranged so that an angle formed by the gas ion beam becomes equal to the specified incident angle, for fixing the clamp section so that the section of the sample is parallel to the fixing surface.
5. The ion beam device of claim 4, wherein instead of the clamp section, the fixing platform fixes a processing clamp section in order to process the section using the focused ion beam.

6. The ion beam device of claim 4, wherein the clamp section is fixed to the fixing platform capable of rotation about a shaft parallel to the fixed surface.
7. The ion beam device of claim 1, wherein the holder member comprises a clamp section for clamping the sample from a rear side thereof, and a fixing platform, provided with a fixing surface arranged so that an angle formed by a gas ion beam becomes equal to the specified incident angle, for fixing the clamp section so that the section of the sample is perpendicular to the fixing surface, and the surface of the sample is positioned at the fixing surface side.
8. The ion beam device of claim 7, wherein the clamp section is fixed to the fixing platform capable of rotation about a shaft perpendicular to the fixed surface.
9. An ion beam processing method, comprising:
  - a first step of forming a section by irradiating a specified focused ion beam from a sample surface side; and
  - a second step of fixing a sample with the section formed thereon from a rear surface side using a holder member, and removing a damage layer on the section by irradiating a gas ion beam to a region including the section from a rear surface side of the sample at a specified incident angle.
10. The ion beam processing method of claim 9, wherein the second step includes a step of varying an incident angle of the gas ion beam to remove the damage layer.

11. The ion beam processing method of claim 9, wherein the first step includes a step of varying the irradiation angle of the specified focused ion beam with respect to the surface of the sample, to form a section.
12. The ion beam processing method of claim 9, wherein the gas ion beam is an inert gas ion beam.
13. A holder member, for fixing a sample having a section formed through irradiation of a specified focused ion beam from a surface side, comprising:  
a clamp section for clamping the sample from a rear surface side of the sample;  
and a fixing platform, provided with a fixing surface arranged so that an angle formed by a gas ion beam irradiated at a specified incident angle with respect to the section becomes equal to the specified incident angle, for fixing the clamp section so that the section of the sample is parallel to the fixing surface.
14. The holder member of claim 13, wherein instead of the clamp section, the fixing platform fixes a processing clamp section in order to process the section using the focused ion beam.
15. The holder member of claim 13, wherein the clamp section is fixed to the fixing platform capable of rotation about a shaft parallel to the fixed surface.
16. A holder member, for fixing a sample having a section formed through irradiation of a specified focused ion beam from a surface side, comprising:  
a clamp section for clamping the sample from a rear surface side of the sample;

and a fixing platform, provided with a fixing surface arranged so that an angle formed by a gas ion beam irradiated at a specified incident angle with respect to the section becomes equal to the specified incident angle, for fixing the clamp section so that the section of the sample is perpendicular to the fixing surface, and the surface of the sample is positioned at the fixed surface side.

17. The holder member of claim 16, wherein the clamp section is fixed to the fixing platform capable of rotation about a shaft perpendicular to the fixed surface.